Special Relays

In This Appendix...

DL230 CPU Special Relays

Startup and Real-Time Relays

SP0	First scan	On for the first scan after a power cycle or program to run transition only. The relay is reset to off on the second scan. It is useful where a function needs to be performed only on program startup.
SP1	Always ON	Provides a contact to insure an instruction is executed every scan.
SP2	Always OFF	Provides a contact that is always off
SP3	1 minute clock	On for 30 seconds and off for 30 seconds.
SP4	1 second clock	On for 0.5 second and off for 0.5 second.
SP5	100 ms clock	On for 50 ms. and off for 50 ms.
SP6	50 ms clock	On for 25 ms. and off for 25 ms.
SP7	Alternate scan	On every other scan.

CPU Status Relays

SP12	Terminal run mode	On when the CPU is in the run mode.
SP16	Terminal program mode	On when the CPU is in the program mode.
SP20	Forced stop mode	On when the STOP instruction is executed.
SP22	Interrupt enabled	On when interrupts have been enabled using the ENI instruction.

System Monitoring

SP40	Critical error	On when a critical error such as I/O communication loss has occurred.
SP41	Warning	On when a non critical error such as a low battery has occurred.
SP43	Battery low	On when the CPU battery voltage is low (only if bit 12 of V7633 is set).
SP44	Program memory error	On when a memory error such as a memory parity error has occurred.
SP45	I/O error	On when an I/O error occurs. For example, an I/O module is withdrawn from the base, or an I/O bus error is detected.
SP47	I/O configuration error	On if an I/O configuration error has occurred. The CPU power-up I/O configuration check must be enabled before this relay will be functional.
SP50	Fault instruction	On when a Fault Instruction is executed.
SP51	Watch Dog timeout	On if the CPU Watch Dog timer times out.
SP52	Grammatical error	On if a grammatical error has occurred, either while the CPU is running or if the syntax check is run. V7755 will hold the exact error code.
SP53	Solve logic error	On if CPU cannot solve the logic.

Accumulator Status

SP60	Value less than	On when the accumulator value is less than the instruction value.
SP61	Value equal to	On when the accumulator value is equal to the instruction value.
SP62	Greater than	On when the accumulator value is greater than the instruction value.
SP63	Zero	On when the result of the instruction is zero (in the accumulator).
SP64	Half borrow	On when the 16-bit subtraction instruction results in a borrow.
SP65	Borrow	On when the 32-bit subtraction instruction results in a borrow.
SP66	Half carry	On when the 16-bit addition instruction results in a carry.
SP67	Carry	On when the 32-bit addition instruction results in a carry.
SP70	Sign	On anytime the value in the accumulator is negative.
SP71	Invalid octal number	On when an Invalid octal number was entered. This also occurs when the V-memory specified by a pointer (P) is not valid.
SP73	Overflow	On if overflow occurs in the accumulator when a signed addition or subtraction results in an incorrect sign bit.
SP74	Underflow	On anytime a math operation results in an underflow error.
SP75	Data error	On if a BCD number is expected and a non–BCD number is encountered.
SP76	Load zero	On when any instruction loads a value of zero into the accumulator.

Counter Interface Module Relays

SP100	XO is on	XO - On when corresponding input is on.

Equal Relays for Multi-step Presets with Up/Down Counter #1 / DL230 (for use with a Counter Interface Module)

SP540	Current = target value	On when the counter current value equals the value in V3630.
SP541	Current = target value	On when the counter current value equals the value in V3632.
SP542	Current = target value	On when the counter current value equals the value in V3634.
SP543	Current = target value	On when the counter current value equals the value in V3636.
SP544	Current = target value	On when the counter current value equals the value in V3640.
SP545	Current = target value	On when the counter current value equals the value in V3642.
SP546	Current = target value	On when the counter current value equals the value in V3644.
SP547	Current = target value	On when the counter current value equals the value in V3646.
SP550	Current = target value	On when the counter current value equals the value in V3650.
SP551	Current = target value	On when the counter current value equals the value in V3652.
SP552	Current = target value	On when the counter current value equals the value in V3654.
SP553	Current = target value	On when the counter current value equals the value in V3656.
SP554	Current = target value	On when the counter current value equals the value in V3660.
SP555	Current = target value	On when the counter current value equals the value in V3662.
SP556	Current = target value	On when the counter current value equals the value in V3664.
SP557	Current = target value	On when the counter current value equals the value in V3666.
SP560	Current = target value	On when the counter current value equals the value in V3670.
SP561	Current = target value	On when the counter current value equals the value in V3672.
SP562	Current = target value	On when the counter current value equals the value in V3674.
SP563	Current = target value	On when the counter current value equals the value in V3676.
SP564	Current = target value	On when the counter current value equals the value in V3700.
SP565	Current = target value	On when the counter current value equals the value in V3702.
SP566	Current = target value	On when the counter current value equals the value in V3704.
SP567	Current = target value	On when the counter current value equals the value in V3706.

DL240/DL250-1/DL260 CPU Special Relays

Startup and Real-Time Relays

SP0	First scan	On for the first scan after a power cycle or program to run transition only. The relay is reset to off on the second scan. It is useful where a function needs to be performed only on program startup.
SP1	Always ON	Provides a contact to insure an instruction is executed every scan.
SP2	Always OFF	Provides a contact that is always off.
SP3	1 minute clock	On for 30 seconds and off for 30 seconds.
SP4	1 second clock	On for 0.5 second and off for 0.5 second.
SP5	100 ms clock	On for 50 ms. and off for 50 ms.
SP6	50 ms clock	On for 25 ms. and off for 25 ms.
SP7	Alternate scan	On every other scan.

CPU Status Relays

SP11	Forced run mode	On anytime the CPU switch is in the RUN position.
SP12	Terminal run mode	On when the CPU switch is in the TERM position and the CPU is in the RUN mode.
SP13	Test run mode	On when the CPU switch is in the TERM position and the CPU is in the test RUN mode.
SP14	Break Relay 1 (DL250-1/260)	On when the BREAK instruction is executed. It is OFF when the CPU is in any other mode.
SP15	Test program mode	On when the CPU is in the TERM position and the CPU is in the TEST PROGRAM MODE.
SP16	Terminal program mode	On when the CPU switch is in the TERM position and the CPU is in the PROGRAM MODE.
SP17	Forced stop mode relay (DL250-1/260)	On anytime the CPU keyswitch is in the STOP position.
SP20	Forced stop mode	On when the STOP instruction is executed.
SP21	Break Relay 2 (DL250-1/260)	On when the BREAK instruction is executed. It is OFF when the CPU mode is changed to RUN.
SP22	Interrupt enabled	On when interrupts have been enabled using the ENI instruction.
SP25	CPU battery disabled relay (DL250-1/260)	On when the CPU battery is disabled by special V-memory.

System Monitoring Relays

SP40	Critical error	On when a critical error such as I/O communication loss has occurred.
SP41	Warning	On when a non-critical error such as a low battery has occurred.
SP43	Battery low/dead	On when the CPU battery voltage is low or dead. Note: The CPU must have a battery installed.
SP44	Program memory error	On when a memory error such as a memory parity error has occurred.
SP45	I/O error	On when an I/O error occurs. For example, an I/O module is withdrawn from the base, or an I/O bus error is detected.
SP46	Communications error	On when a communications error has occured on any of the CPU ports.
SP47	I/O configuration error	On if an I/O configuration error has occured. The CPU power-up I/O configuration check must be enabled before this relay will be functional.
SP50	Fault instruction	On when a Fault Instruction is executed.
SP51	Watch Dog timeout	On if the CPU Watch Dog timer times out.
SP52	Grammatical error	On if a grammatical error has occurred either while the CPU is running or if the syntax check is run. V7755 will hold the exact error code.
SP53	Solve logic error	On if CPU cannot solve the logic.
SP54	Intelligent I/O error	On when communications with an intelligent module has occurred.
SP56	Table instruction overrun	On if a table instruction with a pointer is executed and the pointer value is outside the table boundary

Accumulator Status Relays

SP53	Math/Table pointer error	On if there is math execution error or a table pointer error.
SP60	Value less than	On when the accumulator value is less than the instruction value.
SP61	Value equal to	On when the accumulator value is equal to the instruction value.
SP62	Greater than	On when the accumulator value is greater than the instruction value.
SP63	Zero	On when the result of the instruction is zero (in the accumulator).
SP64	Half borrow	On when the 16-bit subtraction instruction results in a borrow.
SP65	Borrow	On when the 32-bit subtraction instruction results in a borrow.
SP66	Half carry	On when the 16-bit addition instruction results in a carry.
SP67	Carry	On when the 32-bit addition instruction results in a carry.
SP70	Sign	On anytime the value in the accumulator is negative.
SP71	Invalid octal number	On when an Invalid octal number was entered. This also occurs when the V-memory specified by a pointer (P) is not valid.
SP72	Floating Point	On when the numerical value in the accumulator is a floating point number.
SP73	Overflow	On if overflow occurs in the accumulator when a signed addition or subtraction results in an incorrect sign bit.
SP74	Under flow	On when a floating point math operation results in an underflow error.
SP75	Data error	On if data is not a numerical value.
SP76	Load zero	On when any instruction loads a value of zero into the accumulator.

Counter Interface Module Relays

SP100	X0 is on	X0 - on when corresponding input is on.
SP101	X1 is on	X1 - on when corresponding input is on.
SP102	X2 is on	X2 - on when corresponding input is on.
SP103	X3 is on	X3 - on when corresponding input is on.

Communications Monitoring Relays

SP116	DL240 CPU communication	On when the CPU is communicating with another device
SP116	DL250-1/260 communication	On when Port 2 is communicating with another device
SP117	Comm error Port 2 (DL250-1/260)	On when Port 2 has encountered a communication error.
SP120	Module busy Slot 0	On when the communication module in slot 0 is busy transmitting or receiving. You must use this relay with the RX or WX instructions to prevent attempting to execute a RX or WX while the module is busy .
SP121	Comm error Slot 0	On when the communication module in slot 0 of the local base has encountered a communication error.
SP122	Module busy Slot 1	On when the communication module in slot 1 of the local base is busy transmitting or receiving. You must use this relay with the RX or WX instructions to prevent attempting to execute a RX or WX while the module is busy.
SP123	Comm error Slot 1	On when the communication module in slot 1 of the local base has encountered a communication error.
SP124	Module busy Slot 2	On when the communication module in slot 2 of the local base is busy transmitting or receiving. You must use this relay with the RX or WX instructions to prevent attempting to execute a RX or WX while the module is busy.
SP125	Comm error Slot 2	On when the communication module in slot 2 of the local base has encountered a communication error.
SP126	Module busy Slot 3	On when the communication module in slot 3 of the local base is busy transmitting or receiving. You must use this relay with the RX or WX instructions to prevent attempting to execute a RX or WX while the module is busy.
SP127	Comm error Slot 3	On when the communication module in slot 3 of the local base has encountered a communication error.
SP130	Module busy Slot 4	On when the communication module in slot 4 of the local base is busy transmitting or receiving. You must use this relay with the RX or WX instructions to prevent attempting to execute a RX or WX while the module is busy.
SP131	Comm error Slot 4	On when the communication module in slot 4 of the local base has encountered a communication error.
SP132	Module busy Slot 5	On when the communication module in slot 5 of the local base is busy transmitting or receiving. You must use this relay with the RX or WX instructions to prevent attempting to execute a RX or WX while the module is busy.
SP133	Comm error Slot 5	On when the communication module in slot 5 of the local base has encountered a communication error.
SP134	Module busy Slot 6	On when the communication module in slot 6 of the local base is busy transmitting or receiving. You must use this relay with the RX or WX instructions to prevent attempting to execute a RX or WX while the module is busy.
SP135	Comm error Slot 6	On when the communication module in slot 6 of the local base has encountered a communication error.
SP136	Module busy Slot 7	On when the communication module in slot 7 of the local base is busy transmitting or receiving. You must use this relay with the RX or WX instructions to prevent attempting to execute a RX or WX while the module is busy.
SP137	Comm error Slot 7	On when the communication module in slot 7 of the local base has encountered a communication error.

Equal Relays for Multi-step Presets with Up/Down Counter #1 (for use with a Counter Interface Module)

SP540	Current = target value	On when the counter current value equals the value in V3630.
SP541	Current = target value	On when the counter current value equals the value in V3632.
SP542	Current = target value	On when the counter current value equals the value in V3634.
SP543	Current = target value	On when the counter current value equals the value in V3636.
SP544	Current = target value	On when the counter current value equals the value in V3640.
SP545	Current = target value	On when the counter current value equals the value in V3642.
SP546	Current = target value	On when the counter current value equals the value in V3644.
SP547	Current = target value	On when the counter current value equals the value in V3646.
SP550	Current = target value	On when the counter current value equals the value in V3650.
SP551	Current = target value	On when the counter current value equals the value in V3652.
SP552	Current = target value	On when the counter current value equals the value in V3654.
SP553	Current = target value	On when the counter current value equals the value in V3656.
SP554	Current = target value	On when the counter current value equals the value in V3660.
SP555	Current = target value	On when the counter current value equals the value in V3662.
SP556	Current = target value	On when the counter current value equals the value in V3664.
SP557	Current = target value	On when the counter current value equals the value in V3666.
SP560	Current = target value	On when the counter current value equals the value in V3670.
SP561	Current = target value	On when the counter current value equals the value in V3672.
SP562	Current = target value	On when the counter current value equals the value in V3674.
SP563	Current = target value	On when the counter current value equals the value in V3676.
SP564	Current = target value	On when the counter current value equals the value in V3700.
SP565	Current = target value	On when the counter current value equals the value in V3702.
SP566	Current = target value	On when the counter current value equals the value in V3704.
SP567	Current = target value	On when the counter current value equals the value in V3706.

Equal Relays for Multi-step Presets with Up/Down Counter #2 (for use with a Counter Interface Module)

SP570	Current = target value	On when the counter current value equals the value in V3710
SP571	Current = target value	On when the counter current value equals the value in V3712
SP572	Current = target value	On when the counter current value equals the value in V3714
SP573	Current = target value	On when the counter current value equals the value in V3716
SP574	Current = target value	On when the counter current value equals the value in V3720
SP575	Current = target value	On when the counter current value equals the value in V3722
SP576	Current = target value	On when the counter current value equals the value in V3724
SP577	Current = target value	On when the counter current value equals the value in V3726
SP600	Current = target value	On when the counter current value equals the value in V3730
SP601	Current = target value	On when the counter current value equals the value in V3732
SP602	Current = target value	On when the counter current value equals the value in V3734
SP603	Current = target value	On when the counter current value equals the value in V3736
SP604	Current = target value	On when the counter current value equals the value in V3740
SP605	Current = target value	On when the counter current value equals the value in V3742
SP606	Current = target value	On when the counter current value equals the value in V3744
SP607	Current = target value	On when the counter current value equals the value in V3746
SP610	Current = target value	On when the counter current value equals the value in V3750
SP611	Current = target value	On when the counter current value equals the value in V3752
SP612	Current = target value	On when the counter current value equals the value in V3754
SP613	Current = target value	On when the counter current value equals the value in V3756
SP614	Current = target value	On when the counter current value equals the value in V3760
SP615	Current = target value	On when the counter current value equals the value in V3762
SP616	Current = target value	On when the counter current value equals the value in V3764
SP617	Current = target value	On when the counter current value equals the value in V3766